

Table 1
Summary of Corrective Measures Status of SWMUs and AOCs and Associated Soil and Groundwater Exceedences
Chevron Perth Amboy Refinery
Perth Amboy, New Jersey

SWMU / AOC	Description	SOIL										GROUNDWATER					Corrective Measures
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet	
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences					
SWMU 1	North Field Basin																Basin clean closed. In the process of creating tidal wetland.
SWMU 2	Surge Pond																Closure work essentially complete. Will file deed notice and continue with O&M.
SWMU 3	East Yard Basin (EYB)																Currently monitoring closure wells. In the process of filing deed notice with conditional NFA.
SWMU 4	Landfarm																NFA granted on 4/12/06. In the process of lifting deed notice. Located in the Amboy Field and not part of the CMS.
SWMU 5	TEL Burial Area West of Surge Pond	Benzene (17 - 82); Ethylbenzene (35 - 150); Toluene (15 - 130); Xylenes (120 - 1,200)	X		Acenaphthene (4.3 - 11); Anthracene (4.8 - 11); Benzo(a)anthracene (5.8 - 16); Benzo(a)pyrene (6.7 - 16); Chrysene (10 - 25); Naphthalene (31 - 180); Phenanthrene (30 - 94); Pyrene (13 - 33)	X		Total Lead (941 - 3,010)	X		0.57 - 0.88	None	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.			X	ISCO Treatment for organic contaminants in soil, In-Situ Stabilization for lead in soil, install a non-RCRA cap, and file a deed notice afterwards. Continue LRMs, and MNA for groundwater.
SWMU 6	TEL Burial Area North of Tank 306	Benzene (23)		X	Benzo(a)pyrene (0.96)		X	Total Lead (2,150 - 8,340); TEL (33.3); TOL (2.9)	X	X	NAN	NAN	Benzene (22)	None	Iron - Total (37,500); Iron-Dissolved (38,500)	X	ISCO Treatment for organic contaminants in soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. Continue LRMs, and MNA for groundwater.
SWMU 7	TEL Burial Area East of Tank 305	None		X	Benzo(a)pyrene (1.5)		X	Copper (698 - 2,250); Total Lead (1,640); TOL (96.9); Zinc (6,320)		X	None	None	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				In-situ Stabilization for lead in soil and file a deed notice afterwards. CMS recommendation is NFA for groundwater.
SWMU 8	TEL Burial Area Northwest of EYB	Benzene (40 - 820); Toluene (2,400 - 2,600); Xylenes (2,300 - 2,700)	X	X	Benzo(a)pyrene (0.68 - 0.94)	X	X	Total Lead (2,280 - 176,000); TEL (4.1 - 11); TOL (125 - 2,400)	X	X	5.5	35.3 - 801	1,2-Dichloropropane (2); Benzene (570). Additionally, groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.	2, 4 - Dimethylphenol (180); Bis(2-ethylhexyl)phthalate (BEHP) (14)	Arsenic (70); Iron - Total (35,200); Lead (470); Manganese (1,620); Sodium (267,200)	X	ISCO Treatment for organic contaminants in soil, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for lead in soil. Continue LRMs. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.
SWMU 9	TEL Burial North of Tank 753	None		X	None		X	Thalium (4.4)		X	NAN	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				NFI granted 4/1/98. NFA for soils requested in 11/03. CMS recommendation is NFA for groundwater.
SWMU 10	2 TEL Burials Southwest of Tank 771	None		X	Benzo(a)pyrene (2.8)		X	Arsenic (73.8); Copper (1,000); Total Lead (1,090 - 41,600); TEL (780); TOL (38.6)	X	X	NAN	9.33 - 38.7	Benzene (13 - 280)	2-Methylnaphthalene (130)	Arsenic (10.7); Iron - Total (30,300); Iron - Dissolved (7,150); Manganese (1,050); Sodium (149,000)		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead levels > 5 mg/L, and In-Situ Stabilization for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.

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		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)	VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet			
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
SWMU 11a	TEL Burial Area Along Railroad Tracks	None		X	Benzo(a)pyrene (3.1)		X	Total Lead (1,820); TEL (3.45)		X	NAN	NAN					In-situ Stabilization for lead in soil and file a deed notice afterwards. NFA for groundwater granted on 1/21/05 .	
SWMU 11b	2 TEL Burials Areas Along Rail Road Tracks	Soil modeling of PCOCs within this SWMU demonstrated no exceedences.												None	None	Iron-Total (312,000); Manganese (20,300); Sodium (163,000)	X	CMS recommendation is NFA for soil. NFA for groundwater granted on 1/21/05. Continue LRMs for groundwater.
SWMU 12	3 TEL Burial Areas West of Tank 27	None		X	Benzo(a)pyrene (2.3)		X	Total Lead (1,060); TEL (2.67)		X	NAN	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				In-situ stabilization for lead in soil and file a deed notice afterwards. CMS recommendation is NFA for groundwater.	
SWMU 13	TEL Burial Area West of Tank 28	Soil modeling of PCOCs within this SWMU demonstrated no exceedences.												Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				CMS recommendation is NFA for soil and groundwater.
SWMU 14	2 TEL Burial Areas East of Tank 23	Soil modeling of PCOCs within this SWMU demonstrated no exceedences.												None	None	Iron - Total (8,880); Manganese (2,160); Sodium (96,200)		CMS recommendation is NFA for soil. NFA for groundwater granted on 1/21/05.
SWMU 15	TEL Burial Area South of Tank 14	None		X	Benzo(a)pyrene (15)		X	None		X			Benzene (5)	NAN	NAN		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for benzo(a)pyrene concentrations >10 mg/kg in soil. MNA for groundwater.	
SWMU 16	TEL Burial Area South of Tank 306	Benzene (15 - 6,200); Xylenes (2,200)	X	X	Benzo(a)anthracene (9.5); Benzo(a)pyrene (2.8)		X	Arsenic (25 - 78.2); Copper (1,940); TOL (10.1)		X	None	NAN	Benzene (2,300)	2,4-Dimethylphenol (170)	Arsenic (28); Iron - Total (59,300); Lead (7.3); Manganese (15,400); Sodium (357,000)		ISCO Treatment for organic contamination in soil, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TOL concentrations >2 mg/kg in soil. ISCO Treatment for groundwater.	
SWMU 17	TEL Burial Area East of Tank 301	Benzene (16 - 58); Xylenes (2,200)	X	X	Benzo(a)pyrene (1.7 - 2.5)		X	Total Lead (2,160); TOL (2.8 - 117)		X	None	5.19	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences >100 ug/L.				ISCO Treatment for organic contaminants in soil, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for lead in soil. ISCO Treatment for groundwater.	
SWMU 18	TEL Burial Area West of Tank 301	Benzene (15.3 - 26,000); Ethylbenzene (160,000); Toluene (1,020 - 9,700); Xylenes (3,800 - 220,000)	X	X	None		X	Total Lead (1,110 - 5,060); TOL (78.1 - 360)	X	X	0.52	NAN	Benzene (840)	2,4-Dimethylphenol (2,700)	Lead (13)		ISCO Treatment for organic contaminants in soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. ISCO Treatment for groundwater.	
SWMU 19	TEL Burial Area West of Tank 326	Benzene (200); Ethylbenzene (2,300); Toluene (1,000); Xylenes (8,000)	X	X	Benzo(a)anthracene (29 - 45); Benzo(a)pyrene (0.76 - 71); Benzo(b)fluoranthene (16 - 22); Chrysene (49 - 76); Dibenz(a,h)anthracene (0.84 - 12); Indeno(1,2,3-cd)pyrene (18)	X	X	Arsenic (23.2 - 33); TEL (2.87)		X	None	None	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.				ISCO Treatment for organic contaminants in soil with benzo(a)pyrene concentrations <10 mg/kg, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for benzo(a)pyrene concentrations >10 mg/kg and TEL concentrations >2 mg/kg in soil. MNA for groundwater.	

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		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet	
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences					
SWMU 20	TEL Burial Area East of Tank 302	None	X	X	None		X	Arsenic (43.7); Total Lead (1,070 - 15,600); TOL (3.2 - 41.2)	X	X	NAN	13.3	Benzene (130)	NAN	Iron - Total (6,350); Iron-Dissolved (7,050); Lead (31)		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead levels >5 mg/L, and In-Situ Stabilization for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. ISCO Treatment for groundwater.
SWMU 21	TEL Burial Area - Mudflats	Benzene (34); Ethylbenzene (200); Toluene (170); Xylenes (820)	X		Acenaphthene (28); Anthracene (39); Benzo(a)anthracene (28); Benzo(a)pyrene (19); Chrysene (40); Naphthalene (160); Phenanthrene (220); Pyrene (85)	X		Total Lead (1,310)	X		None	None	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.				ISCO Treatment for organic contaminants in soil,In-Situ Stabilization for lead in soil, install a non-RCRA cap, and file a deed notice afterwards. MNA for groundwater.
SWMU 22	TEL Burial Area East of Tanks 329	None		X	Benzo(a)pyrene (1.9)		X	TOL (7.1J)		X	NAN	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.				Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TOL concentrations >2 mg/kg in soil. MNA for groundwater.
SWMU 23	TEL Burial Area West of Tank 116																NFI granted on 4/1/98. Located in the Amboy Field and not part of the CMS.
SWMU 24	TEL Weathering Area East of Tank 9209	Benzene (14 - 29.3)	X	X	Benzo(a)pyrene (2.9); Benzo(b)fluoranthene (4.6)		X	Arsenic (55.6); TEL (3.68)		X	None	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.				ISCO Treatment for organic contaminants in soil, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TEL concentrations >2 mg/kg in soil. MNA for groundwater.
SWMU 25	TEL Burial Area Northeast of EYB																NFA requested on 11/03.
SWMU 26	TEL Burial Area South of EYB	None		X	Benzo(a)pyrene (2)		X	Arsenic (50.7); TOL (13.1)		X	NAN	NAN	None	Benzo(a)anthracene (2); Benzo(a)pyrene (2); Benzo(b)fluoranthene (2)	Aluminum (699); Arsenic (16.8); Iron - Total (214,000); Manganese (12,400); Nickel (206); Sodium (843,000)		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TOL concentrations >2 mg/kg in soil. CMS recommendation is NFA for groundwater.
SWMU 27	TEL Weathering Area North of Tank 312 and West of North Field Basin (NFB)	NAN	X		Benzo(a)anthracene (14); Benzo(b)fluoranthene (12); Benzo(a)pyrene (2 - 22); Indeno(1,2,3-cd)pyrene (5.1); Dibenz(a,h)anthracene (4.9)	X		Antimony (15 - 123); Arsenic (22.8 - 63.5); Copper (1,270 - 3,450); Total Lead (1,100 - 3,880); TEL (4.16); Vanadium (703 - 3,740)	X	X	NAN	None	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for benzo(a)pyrene concentrations >10 mg/kg, and In-Situ Stabilization for lead in soil and file a deed notice for soils with benzo(a)pyrene concentrations >0.66 mg/kg, as well as for lead contaminated soil afterwards. CMS recommendation is NFA for groundwater.
SWMU 28	Reactor Burial Area	None		X	Benzo(a)pyrene (0.82 - 5.6)		X	None		X	NAN	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				Further investigation of phthalic anhydride reactor area soil will be conducted. CMS recommendation is NFA for groundwater.
SWMU 29	Fines Transfer Area	None		X	Benzo(a)pyrene (1 - 8.6)		X	Total Lead (866 - 3,880); TOL (3)	X	X	NAN	None	Benzene (2)	None	Arsenic (11); Lead (8.2)		In-Situ Stabilization for lead in soil and file a deed notice afterwards. MNA for groundwater.

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		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet	
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences					
SWMU 30	Short Term Storage Area	None		X	Benzo(a)pyrene (0.82 - 5.6)		X	None		X	NAN	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.
SWMU 31	Effluent Treatment Plant Area	None		X	Benzo(a)pyrene (1.2)		X	Total Lead (1,880)		X	NAN	NAN	None	None	Iron - Total (8,260 - 108,000); Iron-Dissolved (8,730 - 76,300)		In-Situ Stabilization for lead in soil and file a deed notice afterwards. CMS recommendation is NFA for groundwater.
SWMU 32	PCB Waste Storage Building																NFA requested 8/08.
SWMU33	Temporary Slurry Pit																NFA conditionally approved on 8/22/03. Located in the West Yard and not part of the CMS.
SWMU 34	Dumpster and Drainage Area	None		X	Benzo(a)pyrene (4.46 - 31.2)		X	Arsenic (43.4); Beryllium (39.7); Nickel (3,080); Total Lead (1,060 - 22,700); Zinc (4,860)	X	X	NAN	10.4 - 310	1,1- Dichloroethylene (120); Benzene (1 - 43); cis-1,2-Dichloroethylene (110); Tetrachloroethylene (1); Trichloroethylene (820); Vinyl chloride (1 - 26)	None	Aluminum (1,610); Cadmium (182); Iron - Total (1,270 - 110,000); Iron - Dissolved (450 - 105,000); Lead (84); Manganese (219 - 5,980); Nickel (313); Zinc (5,070)		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead levels > 5mg/L and benzo(a)pyrene concentrations >10 mg/kg in soil, and In-Situ Stabilization for TCLP lead Levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice for soils with benzo(a)pyrene concentrations >0.66 mg/kg, as well as for lead contaminated soil afterwards. MNA for groundwater.
SWMU 35	No. 4 Separator (&AOC 6A)	Benzene (14 - 24)	X	X	Benzo(a)anthracene (1.7); Benzo(a)pyrene (0.93 - 5.9); Naphthalene (22 - 31)	X	X	Arsenic (30.3 - 48.3)		X	None	NAN	Benzene (64 - 180)	None	Iron - Total (31,400 - 49,100); Iron-Dissolved (28,200 - 53,200)		ISCO Treatment for organic contaminants in soil. ISCO Treatment for benzene concentrations >100 ug/L and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.
SWMU 36	Oil/Water Separator	None		X	Benzo(a)pyrene (2.5)		X	Arsenic (26.7)		X			Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				Containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil. CMS recommendation is NFA for groundwater.
SWMU 37	West Yard (WY) Sludge Pond																NFA conditionally approved on 8/22/03. Located in the West Yard and not part of the CMS.
SWMU 38	North Field Slop Pond	None		X	Benzo(a)pyrene (1.2 - 18)	X	X	None		X	NAN	NAN					Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for benzo(a)pyrene concentrations >10 mg/kg in soil and file a deed notice for soils with benzo(a)pyrene concentrations >0.66 mg/kg. NFA for groundwater granted on 1/21/05.
SWMU 39	Unnamed NF Pond	Benzene (210); Isopropylbenzene (600); Xylenes (740)		X	Benzo(a)pyrene (5.4 - 7.5)		X	Arsenic (22.8); Total Lead (1,430)	X	X	NAN	None	Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				ISCO Treatment for organic contaminants in soil, containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. CMS recommendation is NFA for groundwater.

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		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences					
SWMU 40	Old Pond	Benzene (87.6 - 5,500); Xylenes (1,600 - 2,200)	X	X	Benzo(a)pyrene (12.7)		X	Copper (796)		X	17 - 33	NAN	Benzene (19)	Bis(2-ethylhexyl)phthalate (BEHP) (12)	Arsenic (15.2 - 16.6); Iron - Total (6,920); Iron - Dissolved (4,990)		ISCO Treatment for Soil. MNA for groundwater.
SWMU 41	Drying Area	Benzene (14 - 29.3)	X	X	Benzo(a)anthracene (17); Benzo(a)pyrene (0.74 - 9.6)		X	Arsenic (76.8); Copper (607); Total Lead (1,880); Zinc (2,060)		X	None	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L.				ISCO Treatment for organic contaminants in soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. MNA for groundwater.
SWMU 42	East Yard Crude Slab	Benzene (16)	X	X	Benzo(a)pyrene (1.6)		X	Total Lead (977)		X	None	NAN	Groundwater modeling of PCOCs within this SWMU demonstrated benzene exceedences between 1 and 100 ug/L, and >100 ug/L.		Groundwater modeling of PCOCs within this SWMU demonstrated lead exceedences between 5 and 50 ug/L, and >50 ug/L.		ISCO Treatment for organic contaminants in soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.
SWMU 43	Mud Flats	Benzene (17 - 34); Ethylbenzene (23 - 200); Toluene (15 - 170); Xylenes (40 - 1,200)	X		Acenaphthene (4.4 - 25); Anthracene (3.4 - 27); Benzo(a)anthracene (4 - 29); Benzo(a)pyrene (4 - 61); Chrysene (3.5 - 40); Naphthalene (23 - 270); o-Cresol (25); m&p - Cresol (20); Phenanthrene (7.3 - 180); Pyrene (8.2 - 67)	X		Total Lead (941 - 3,010)	X		0.57 - 0.88	70.1	Benzene (2 - 48)	NAN	Iron - Total (10,800 - 11,200); Iron-Dissolved (7,860)	X	ISCO Treatment for organic contaminants in soil, In-Situ Stabilization for lead in soil, install a non-RCRA cap, and file a deed notice afterwards. Continue LRMs, and MNA for groundwater.
SWMU 44	Unnamed Main Yard Pond	None		X	Benzo(a)pyrene (1 - 5.1)		X	None		X	NAN	NAN	None	NAN	NAN		File a deed notice for soil. NFA for groundwater granted on 1/21/05.
SWMU 45	Surface Impoundment South of EYB																Currently monitoring closure wells. In the process of filing deed notice with conditional NFA.
SWMU 46	North Field Extension(NFE) Lagoon 1																Located in the NFE and not part of the CMS.
SWMU 47	NFE Lagoon 2																Located in the NFE and not part of the CMS.
SWMU 48	NFE Lagoon 3																Located in the NFE and not part of the CMS.
SWMU 49	NFE Lagoon 4																Located in the NFE and not part of the CMS.
SWMU 50	Former NFE Debris Pile No.1																RIR accepted. Located in the NFE and not part of the CMS.
SWMU 51	Oily Soil Pad																NFI requested 4/08.
SWMU 52	TEL Burial Area Southwest of Tank 13												Groundwater modeling of PCOCs within this SWMU demonstrated no exceedences (see footnote 26).				NFI granted on 4/1/98. NFA for soil requested on 11/03. CMS recommendation is NFA for groundwater.

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SWMU / AOC	Description	SOIL										GROUNDWATER						Corrective Measures
		VOCs (mg/kg)		SVOCs (mg/kg)				Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet		
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS			
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
SWMU 53	Potential Discharge - Tank Basin 312	None		X	Benzo(a)pyrene (1.1)		X	None		X	NAN	NAN	None	NAN	Iron - Total (26,500); Iron-Dissolved (23,500)		File a deed notice for soil. CMS recommendation is NFA for groundwater.	
SWMU 54	No.2 Amine Plant Molten Sulfur Pit																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 55	No.2 Amine Plant Holding Basin																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 56	No.3 Sulfur Recovery Unit Neutralization Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 57	No.3 Sulfur Recovery Unit Acid Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 58	No.3 Sulfur Recovery Unit Neutralization Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 59	No.4 Sulfur Recovery Unit Sulfur Pit																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 60	No.4 Sulfur Recovery Unit Acid Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 61	No.2 Amine Plant Wash Water Collection Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
SWMU 62	No.2 Amine Plant Slurry Collection Sump																NFA conditionally approved. Located in the West Yard and not part of the CMS.	
AOC 1	Potential Discharge - Tank 1																NFA requested on 11/03.	
AOC 2	Potential Discharge - Tank 3																NFA requested on 11/03.	
AOC 3	Potential Discharge - Tank 4																NFA requested on 11/03.	
AOC 4	Potential Discharge - Tank 106																NFA requested on 10/03. Located in the Amboy Field and not part of the CMS.	
AOC 5	Petroleum Substance Near Underground Storage Tank E3	None		X	Benzo(a)pyrene (5.4 - 7.5)		X	Total Lead (1,430)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				In-Situ Stabilization for lead in soil and file a deed notice afterwards. CMS recommendation is NFA for groundwater.	
AOC 6A	Oily Material (B26 & B34)	None		X	Benzo(a)pyrene (1.4 - 9.5)		X	Arsenic (45.5); Thallium (3.4)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 6B	Oily Material (B29, B30 & B31)												Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				Capping of arsenic soil contamination and file a deed notice afterwards. CMS recommendation is NFA for groundwater.	
AOC 6C	Oily Material (B32 & B33)	None		X	None		X	Arsenic (26.3)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 7	Tarry Material at MW-13	Soil modeling of PCOCs within this AOC demonstrated no exceedences.												Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				CMS recommendation is NFA for soil and groundwater.
AOC 8	Oily & Tarry Material at B27 & B28	Soil modeling of PCOCs within this AOC demonstrated benzene exceedences >13 mg/kg.	X	X									Groundwater modeling of PCOCs within this AOC demonstrated benzene exceedences between 1 and 100 ug/L, and >100 ug/L.				ISCO Treatment for soil. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	

Table 1
Summary of Corrective Measures Status of SWMUs and AOCs and Associated Soil and Groundwater Exceedences
Chevron Perth Amboy Refinery
Perth Amboy, New Jersey

SWMU / AOC	Description	SOIL											GROUNDWATER					Corrective Measures
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)	VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet			
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
AOC 9A	Contamination at NF-10												Benzene (6 - 490); Xylenes (2,000)	None	Iron - Total (3,470 - 9,480); Iron-Dissolved (2,760 - 8,820); Lead (31)		CMS recommendation is NFA for soil. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	
AOC 9B	Contamination at NF-11												Benzene (85)	None	Iron - Total (45,600); Iron-Dissolved (42,200)		NFA for soil requested on 11/03. MNA for groundwater.	
AOC 10	Stained Soil & Gravel Near IAF Tank	None		X	Benzo(a)pyrene (4.8 - 4.9)		X	None		X	NAN	NAN	None	None	None		File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 11	Potential Debris Pile Adjacent to Former Building in NFE																RIR accepted. Located in the NFE and not part of the CMS.	
AOC 12	Potential NFE Lagoon 5																RIR accepted. Located in the NFE and not part of the CMS.	
AOC 13	Oily Fill Material (B-11)	None		X	None		X	Arsenic (31)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 14	GWQAP Oily Fill Area III	Benzene (15.5 - 36)		X	Benzo(a)pyrene (0.91)		X	Arsenic (22.3 - 83.2); Total Lead (901)		X	NAN	NAN	None. Additionally, groundwater modeling of PCOCs within this AOC demonstrated benzene exceedences between 1 and 100 ug/L.	Benzo(a)anthracene (2); Benzo(a)pyrene (2); Benzo(b)fluoranthene (2)	Aluminum (699); Arsenic (16.8); Iron - Total (30,300 - 214,000); Iron - Dissolved (31,300); Manganese (12,400); Nickel (206); Sodium (843,000)		ISCO Treatment for organic contaminants in soil, containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. MNA for groundwater.	
AOC 15	Oil Release at Buckeye Pipe Manifold	Benzene (68); Toluene 91,200); Xylenes (2,600)	X	X	2,4 - Dinitrotoluene (20); Naphthalene (22)	X	X	None	X	X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated benzene exceedences between 1 and 100 ug/L, and >100 ug/L.				ISCO Treatment for soil. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	
MY - AOC 16	Oily Water Sewer System - Main Yard	Benzene (14 - 5,500); Xylenes (2,200)	X	X	Benzo(a)pyrene (0.91 - 27); Dibenz(a,h)anthracene (0.80); Naphthalene (23 - 65)	X	X	Arsenic (28 - 55.1); Thallium (2.09 - 4.4); Total Lead (1,330 - 1,640)	X	X	1.6 - 33	NAN	Benzene (1 - 3,400)	2,4-Dimethylphenol (480)	Iron - Total (793 - 26,000); Iron-Dissolved (548 - 27,700)		ISCO Treatment for organic contaminants in soil with benzo(a)pyrene concentrations <10 mg/kg, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for organic contaminants in soil with benzo(a)pyrene concentrations >10 mg/kg. In-Situ Stabilization for lead in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	

Table 1
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Perth Amboy, New Jersey

SWMU / AOC	Description	SOIL										GROUNDWATER					Corrective Measures
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet	
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences					
EY - AOC 16	Oily Water Sewer System - East Yard	Benzene (16 - 170); Xylenes (1,200)	X	X	Benzo(a)pyrene (0.69 - 38)	X	X	Arsenic (20.7- 69.9); Total Lead (831 - 10,700)	X	X	None	8.61 - 13.6	Benzene (3 - 9,500); Ethylbenzene (870 - 1,200); Methyl ethyl ketone (880); Toluene (10,000 - 12,000); Xylenes (6,600 - 7,800)	Benzo(a)anthracene (3); Benzo(a)pyrene (3); Benzo(b)fluoranthene (3); Benzo(k)fluoranthene (1)	Aluminum (622 - 3,170); Antimony (12.8); Arsenic (73 - 360); Iron - Total (322 - 80,600); Iron - Dissolved (4,800 - 84,400); Lead (10.2 - 351); Manganese (463 - 2,120); Sodium (74,400 - 392,000)	ISCO Treatment for organic contaminants in soil with benzo(a)pyrene concentrations <10 mg/kg, and Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for organic contaminants in soil with benzo(a)pyrene concentrations >10 mg/kg and TCLP lead levels > 5mg/L in soil. Containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil. In-Situ Stabilization for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	
CY - AOC 16	Oily Water Sewer System - Central Yard	None		X	Benzo(a)pyrene (3.8 - 17)		X	None		X	NAN	NAN	Benzene (38 - 270)	Benzo(a)anthracene (10); Benzo(a)pyrene (7); Benzo(b)fluoranthene (3); Bis(2-ethylhexyl)phthalate (BEHP) (20); Chrysene (20)	Iron - Total (56,900); Manganese (7,880); Sodium (219,000)	Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for organic contaminants in soil with benzo(a)pyrene concentrations >10 mg/kg and file a deed notice for soils with benzo(a)pyrene concentrations >0.66 mg/kg afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	
AOC 17	Potential Discharge - Tank 20	None		X	Benzo(a)pyrene (0.91)		X	None		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).			File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 18	Potential Discharge - Tank 2	Soil modeling of PCOCs within this AOC demonstrated no exceedences.										Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).			CMS recommendation is NFA for soil and groundwater.		
AOC 19	Main Yard Pipeway	None	X	X	Benzo(a)pyrene (1.3 - 6)		X	None		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).			File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 20	Aboveground Product Pipe Manifold															NFA requested on 4/05. Located in the Amboy Field and not part of the CMS.	
AOC 21	Maurer Road Excavation / SS Loading Rack												Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).			CMS recommendation is NFA for soil and groundwater.	
AOC 22	Shops Building Groundwater Contamination	Benzene (33); Xylenes (2,300)	X		Benzo(a)pyrene (1.4 - 4.72)	X	X	Total Lead (1,060 - 22,700)	X	X	NAN	10.4 - 310	Benzene (2 -1,100); Ehtylbenzene (2,500); Toluene (2,200); Xylenes (15,000)	Naphthalene (500)	Iron - Total (32,800); Iron - Dissolved (35,400); Manganese (1,590); Sodium (70,700)	ISCO Treatment for organic contaminants in soil. Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead levels > 5mg/L, and In-situ Stabilization for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	

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SWMU / AOC	Description	SOIL										GROUNDWATER						Corrective Measures
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)	VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet			
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		Contaminant and Range of Exceedences of NJDEP GWQS		
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
AOC 23	Tank Basin 327	None	X	X	None			X	Arsenic (25.9 - 117); Total Lead (981 - 8,450); TOL (91.9)	X	X	None	7.58	Benzene (28 - 350)	NAN	Iron - Total (13,100 - 29,000); Iron-Dissolved (11,800 - 28,000); Lead (7.2)		Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead Levels > 5mg/L, and In-Situ Stabilization for TCLP lead Levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.
AOC 24	Release at Fire Hydrant Northwest of Tank 4																	NFA for groundwater granted on 1/21/05. Postponed NFA request for soil until SRFI comment No.28 is resolved.
AOC 25	Release at Former Cat Cracker	Soil modeling of PCOCs within this AOC demonstrated no exceedences.												Groundwater modeling of PCOCs within this AOC demonstrated benzene exceedences between 1 and 100 ug/L.			X	CMS recommendation is NFA for soil. Continue LRMs, and MNA for groundwater.
AOC 26	East Yard Bunker Slab	Benzene (19)		X	Benzo(a)pyrene (1)		X	Arsenic (31.1 - 60.3)		X	NAN	NAN	None	NAN	Iron - Total (7,470); Iron - Dissolved (6,130)		ISCO Treatment for soil. CMS recommendation is NFA for groundwater.	
AOC 27	Tank 777 Pipeway	None		X	None		X	Arsenic (23.9)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 28	Asphalt Plant Tanks	None		X	Benzo(a)pyrene (0.75)		X	None		X	NAN	NAN					File a deed notice for soil. NFA granted for groundwater on 1/21/05.	
AOC 29	5 Berth Area	None		X	Benzo(a)anthracene (18); Benzo(a)pyrene (1.7 - 100); Benzo(b)fluoranthene (6.2); Dibenz(a,h)anthracene (0.86)		X	Total Lead (2,100). Additionally, soil modeling of PCOCs within this AOC demonstrated arsenic exceedences >20 mg/kg.		X	NAN	NAN	None	None	Iron - Total (6,440); Iron - Dissolved (6,370)		Revetment, asphalt collection, and operation, maintenance and monitoring of groundwater and surface water, and file a deed notice afterwards.	
AOC 30	Tank 27 Pipeway	Soil modeling of PCOCs within this AOC demonstrated no exceedences.																CMS recommendation is NFA for soil. NFA granted for groundwater on 1/21/05.
AOC 31	Tank 772 Pump Pad	Benzene (34 - 74)		X	None		X	Arsenic (39.8 - 58.6); Total Lead (1,280)		X	NAN	NAN	Benzene (9,200)	NAN	Iron - Total (39,200); Iron - Dissolved (27,400)		ISCO Treatment for organic contaminants in soil. Containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil. In-Situ Stabilization for lead in soil and file a deed notice afterwards. ISCO Treatment for groundwater.	

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SWMU / AOC	Description	SOIL										GROUNDWATER					Corrective Measures	
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet		
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS			
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
AOC 32	Tank 16 Basin	Soil modeling of PCOCs within this AOC demonstrated no exceedences.												Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				CMS recommendation is NFA for soil and groundwater.
AOC 33	Tank 314 Basin	None		X	Benzo(a)pyrene (1.01 - 4.92)		X	Nickel (1,550); Total Lead (2,210); Copper (2,890); Zinc (10,500)		X	NAN	NAN	Benzene (92)	NAN	Iron - Total (6,880); Iron-Dissolved (5,460)		In-situ Stabilization for soil and file a deed notice afterwards. MNA for groundwater.	
AOC 34	Tank 315 Basin	None		X	None		X	Arsenic (29.6)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 35	Tank 771 Basin	None		X	None		X	Arsenic (21.3 - 23.7)		X	NAN	NAN					NFA granted on 1/21/05.	
AOC 36	Chlorinated Hydrocarbons in Groundwater	Soil modeling of PCOCs within this AOC demonstrated no exceedences.												1,1,1-Trichloroethane (49 - 1,500); 1,1,2-Trichloroethane (6); 1,1-Dichloroethane (53 - 760); 1,1-Dichloroethylene (3 - 1,200); Chloroethane (180); Tetrachloroethylene (2 - 9); Trichloroethylene (5 - 1,200); Vinyl chloride (2 - 120)	None	Aluminum (374 - 843); Arsenic (10.3 22.5); Iron - Total (849 - 205,000); Iron - Dissolved (411 - 194,000); Manganese (919); Nickel (112); Sodium (56,100 - 281,000); Thallium (15.1)		CMS recommendation is NFA for soils. MNA for groundwater.
AOC 37	East Yard Gasoline Filters	Benzene (19)		X	None		X	Thallium (2.4 - 2.5); Total Lead (1,910)	X	X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				ISCO Treatment for organic contaminants in soil, and In-Situ Stabilization for lead in soil and file a deed notice afterwards. The presence of COCs in groundwater needs to be confirmed or refuted through installation of a permanent monitoring well(s).	
AOC 38	Barge Loading Manifold at Tank 761and G180/181 Naphtha Pumps	Benzene (78)	X	X	Benzo(a)pyrene (1.6)		X	Arsenic (70.4)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				ISCO Treatment for organic contaminants in soil. Containment consisting of a cap with filing a deed notice afterwards for arsenic concentrations >20 mg/kg in surface soil. CMS recommendation is NFA for groundwater.	
AOC 39	East Yard Pump House and PRC Loading Rack	Benzene (36)		X	None		X	Arsenic (22.1)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				ISCO Treatment for soil. CMS recommendation is NFA for groundwater.	
AOC 40	Tank Basin 22	None		X	Benzo(a)pyrene (0.94)		X	Arsenic (35.3)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 41	Tank Basin 300	Benzene (14 - 61)	X	X	None		X	Total Lead (2,320); TEL (5.6)	X	X	NAN	None	Benzene (24,000); Toluene (1,400); Xylenes (1,500)	NAN	Iron - Total (16,300); Iron-Dissolved (14,700)		ISCO Treatment for benzene in soil, and In-situ Stabilization for lead in soil and file a deed notice afterwards. ISCO Treatment for groundwater.	

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SWMU / AOC	Description	SOIL										GROUNDWATER					Corrective Measures	
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)		VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet		
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS			
			CMS	Pre-CMS		CMS	Pre-CMS		CMS	Pre-CMS	Range of Exceedences	Range of Exceedences						
AOC 42	Tank Basin 310	Soil modeling of PCOCs within this AOC demonstrated no exceedences.												Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				CMS recommendation is NFA for soil and groundwater.
AOC 43	Tank Basin 311	None		X	Benzo(a)pyrene (0.7)		X	None		X	NAN	NAN	None	None	Iron - Total (13,400); Iron-Dissolved (23,000); Manganese (2,440)		File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 44	Tank Basin 313	None		X	Benzo(a)pyrene (6.6); Benzo(a)anthracene (22); Benzo(b)fluoranthene (11); Benzo(k)fluoranthene (4.5)		X	Arsenic (29)		X	NAN	NAN	Benzene (200). Additionally, groundwater modeling of PCOCs within this AOC demonstrated benzene exceedences between 1 and 100 ug/L.	NAN	Iron - Total (2,750 - 42,000); Iron-Dissolved (1,550 - 31,300)	X	File a deed notice for soil. Continue LRMs. ISCO Treatment for benzene concentrations >100 ug/L, and MNA for benzene concentrations between 1 and 100 ug/L in groundwater.	
AOC 45	Tank Basin 748	None		X	Benzo(a)pyrene (1.7)		X	Arsenic (22.2 - 139); Copper (1,080)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				Capping of arsenic soil contamination and file a deed notice afterwards. CMS recommendation is NFA for groundwater.	
AOC 46	Tank Basins 749 and 780	Benzene (31)	X	X	Benzo(a)pyrene (0.74 - 3.2)		X	Arsenic (26.2 - 431); Total Lead (1,630 - 4,680)		X	NAN	8.95	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				ISCO Treatment for organic contaminants in soil. Excavation, Ex-Situ Stabilization and Disposal in Tailored CAMU for TCLP lead levels > 5mg/L, and In-situ Stabilization for TCLP lead levels <5 mg/L and lead levels >800 mg/kg in soil and file a deed notice afterwards. Capping of arsenic soil contamination and file a deed notice afterwards. CMS recommendation is NFA for groundwater.	
AOC 47	No. 4 Crude Unit	None		X	Benzo(a)pyrene (1.1 - 2); Benzo(a)anthracene (5.2)		X	Arsenic (48.2)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	
AOC 48	Isomax Process Plant	None		X	Benzo(a)pyrene (1 - 5.1); Benzo(a)anthracene (12); Dibenz(a,h)anthracene (4.1)		X	None		X	NAN	NAN	Benzene (6)	NAN	NAN		File a deed notice for soil. MNA for groundwater.	
AOC 49	No.3 Rheniformer	None		X	Benzo(a)pyrene (2.3 - 7); Benzo(a)anthracene (12); Benzo(b)fluoranthene (7.3); Dibenz(a,h)anthracene (1.2)		X	Arsenic (28.4 - 30.1)		X	NAN	NAN	Groundwater modeling of PCOCs within this AOC demonstrated no exceedences (see footnote 26).				File a deed notice for soil. CMS recommendation is NFA for groundwater.	

Table 1
Summary of Corrective Measures Status of SWMUs and AOCs and Associated Soil and Groundwater Exceedences
Chevron Perth Amboy Refinery
Perth Amboy, New Jersey

SWMU / AOC	Description	SOIL										GROUNDWATER					Corrective Measures
		VOCs (mg/kg)			SVOCs (mg/kg)			Metals (mg/kg)			USEPA TCLP Characteristic Hazardous Waste Regulatory Level (mg/L)	VOCs (ug/L)	SVOCs (ug/L)	Metals (ug/L)	Presence of LNAPL Thickness > 0.01 Feet		
		Contaminant and Range of Exceedences of NJDEP NRDSCC	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Naphthalene)	Source of Data		Contaminant and Range of Exceedences of NJDEP NRDSCC (NRDSCS for Lead)	Source of Data		Benzene	Lead	Contaminant and Range of Exceedences of NJDEP GWQS	Contaminant and Range of Exceedences of NJDEP GWQS		Contaminant and Range of Exceedences of NJDEP GWQS	
			CMS	Pre- CMS		CMS	Pre- CMS		CMS	Pre- CMS	Range of Exceedences	Range of Exceedences					

- Notes:
1. AOC = Area of Concern
 2. CAMU = Corrective Action Management Unit
 3. ISCO = In-Situ Chemical Oxidation
 4. LNAPL = Light Non-Aqueous Phase Liquid
 5. LRMs = LNAPL Removal Measures including vac trucks and belt skimmers
 6. MNA = Monitoring Natural Attenuation
 6. NAN = Not Analyzed
 7. NFA = No Further Action
 8. NFI = No Further Investigation
 9. NJDEP = New Jersey Department of Environmental Protection
 10. NRDSCC = Non-Residential Direct Contact Soil Cleanup Criteria
 11. NRDSCS = Non-Residential Direct Contact Soil Cleanup Standard
 12. O & M = Operation and Maintenance
 13. PCOCs = Principal Contaminants of Concern including benzene, benzo(a)pyrene and lead.
 14. SRFI = Supplemental RCRA Facility Investigation
 15. SVOCs = Semi-Volatile Organic Compounds
 16. SWMU = Solid Waste Management Unit
 17. TCLP = Toxicity Characteristic Leaching Procedure
 18. TEL = Tetraethyl Lead
 19. TOL = Total Organic Lead
 20. USEPA = United States Environmental Protection Agency
 21. VOCs = Volatile Organic Compounds
 22. Blue shaded cells indicate the location of the corresponding SWMU or AOC is in the West Yard or Amboy Field, and not part of the CMS.
 23. Green shaded cells indicate the location of the corresponding SWMU or AOC is in the North Field Extension, and not part of the CMS.
 24. Grey shaded cells indicate NFA for the corresponding SWMU or AOC located in the Main, East, or Central Yards.
 25. Soil exceedence data was obtained from the Full RCRA Facility Investigation (RFI) Report (2001 - 2003), SWMU/AOC Assessment Report – AOC 37 through AOC49 (2007), Supplemental RFI Report (2006 - 2008), and Corrective Measures Study Pre-Design Investigation Report (2006 - 2008). See Figures 2 through 4 for the soil contamination impacted SWMUs and AOCs located in the Main Yard, East Yard, and Central Yard, respectively.
 26. Groundwater exceedence data was obtained from the sitewide groundwater sampling events conducted in the second quarter of 2007 for the Main Yard, first quarter of 2007 for the East Yard, and third quarter of 2006 for the Central Yard. See Figures 2 through 4 for the groundwater contamination impacted SWMUs and AOCs located in each Yard.
 27. Corrective Measures for SWMUs and AOCs' impacted soil and groundwater are based on their associated exceedence data and PCOCs groundwater modeled delineations demonstrating exceedences depicted in Figures 2 through 4. See Figures 23 through 25 for the Corrective Measures recommended to SWMUs and AOCs located in the Main Yard, East Yard, and Central Yard, respectively.